

PROXIMAL FEMORAL VARUS OSTEOTOMY FOR PERTHES DISEASE

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SUMMARY

Purpose: The purpose of this study is to evaluate the results of patients treated with proximal femoral varus osteotomy for Perthes disease.

Patients and Methods: This operation was performed on 13 patients in the 2nd Orthopaedic Clinic of Ministry of Health Ankara Hospital, between October 93 and December 96. Average age of patients at the time of operation was 7.9 years (range, 6 to 11 years), male to female ratio was 11/2. Average follow up was 21,3 months (range, 11 to 34 months). The results were evaluated by "Iowa Hip Rating" criteria's.

Results: Preoperatively the mean epiphyseal extrusion was 18.1% (range, 10.4% to 28.3%) and mean Wiberg's CE angle was 24.7° (range, 20.3° to 30.2°). In the last follow-up examinations the mean values were 9.5% (range, 7.4% to 16.7%) and 34.1° (range, 27.3° to 38.5°) respectively. Preoperatively, the mean collo-diaphyseal angle was 133.5°, that decreased to 118.4° at the final follow-up. According to the "Iowa Hip Rating" the results were successful in 7 (54%) patients, moderately successful in 4 (31%) patients and unsuccessful in 2 (15%) patients. One of the patients in the bad result group was 11 years old and the other was 10 years old and both of them were in Catterall Group IV.

Conclusion: Best results with proximal femoral varus osteotomy can be obtained in children without any femoral head deformity and flattening, with good containment in abduction and internal rotation and in children between the ages of 6-10 years.

Key Words: *Proximal Femoral Varus Osteotomy, Perthes Disease.*

ÖZET

PERTHES HASTALIĞINDA PROKSİMAL FEMORAL VARUS OSTEOTOMİSİ

S.B. Ankara Hastanesi 2. Ortopedi Kliniğinde Ekim 1993-Aralık 1996 yılları arasında Perthes hastalığı olan 13 çocuğa Proksimal Femoral Varus Osteotomisi uygulandı. Hastaların ameliyat esnasındaki ortalama yaşı 7.9 yıl (min. 6-max. 11 yıl) ve erkek/kız oranı 11/2 idi. Ortalama takip süresi 21.3 ay (min. 11-max. 34 ay) idi. Ameliyat öncesi ortalama epifizyal taşma %18.1 (min. %10.4-max. %28.3) ve ortalama CE açısı 24.7° (min. 20.3°-max. 30.2°) iken, son kontrollerde ortalama değerler sıra ile %9.5 (min. %7.4-max. %16.7) ve 34.1° (min. 27.3°-max. 38.5°) idi. Ameliyat öncesi ortalama boyun-cisim açısı 133.5° iken son kontrollerde bu değer ortalama 118.4° idi. Sonuçlar "Iowa Hip Rating" kriterlerine göre değerlendirildiğinde 7 (%54) hastada mükemmel, 4 (%31) hastada iyi ve 2 (%15) hastada kötü sonuç elde edildi. Kötü sonuç elde edilen hastalardan biri 11 diğeri 10 yaşında idi ve ikisi de Catterall Grup IV idi. Sonuç olarak; femur başında aşırı deformasyon ve düzleşmenin olmadığı, abduksiyon-iç rotasyonda "containment" in sağlandığı, özellikle 6-10 yaş arası çocuklarda proximal femoral varus osteotomisi ile başarılı sonuçlar elde edilebilir.

Anahtar Kelimeler: *Proksimal Femoral Varus Osteotomisi, Perthes Hastalığı.*

INTRODUCTION

The cornerstone of present-day treatment for Legg-Calve-Perthes disease is referred to as containment. Containment is an attempt to reduce the forces through the hip joint by actual or relative varus positioning. Containment may be achieved by non-operative or operative methods¹⁻⁵. The general

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acceptation is that treatment is not indicated in all cases in Catterall Group I and in most of those in Catterall Group II in children under seven years of age. Patients in group II who are eight years of age or older and all those in Catterall Group III and IV require treatment in order to obtain a satisfactory hip. Many investigators have advocated surgical methods for providing or maintaining containment. Surgical containment methods offer the advantage of early mobilization and avoidance of prolonged bracing or cast treatment⁴⁻⁸.

Axer popularized the most common surgical method for the treatment of Legg-Calve-Perthes disease in 1965. In this method proximal femoral varus osteotomy is used to prevent the subluxation of the femoral head and to cover it by acetabulum. By this way the direction of the vectorial stress force on the femoral head is changed and so the iliopsoas and adductor muscles which are effecting on the joint are relaxed. Also after the osteotomy the circulation of the proximal femur increases, and the regeneration of the necrotic tissues of the femoral head with a spherical re-shapement can be achieved by good containment of the femoral head with the acetabulum⁹⁻¹¹.

We investigated the short-term results of the proximal femoral varus osteotomies in the treatment of Perthes disease in our clinic.

MATERIALS AND METHODS

Proximal femoral varus osteotomy procedure was used to cure 13 patients with Legg-Calve-Perthes disease between October 1993 and December 1996. The disease was left sided in 8 of the patients, and right sided in the remaining 5. The mean age of the patients was 7.9 years (range, 6 to 11 years). The ratio of male to female was 11/2. The average follow-up was 21.3 months (range, 11 to 34 months), for 7 patients this time was over 2 years.

The main complaints of the patients were hip pain in eight, knee pain in 4 and foot pain in 1. Clinically subjective complaints and their beginning times were noted and, flexion, abduction, internal and external rotation capabilities of the hips and the difference between the length's of the extremities were all measured. All patients had pelvic anteroposterior x-rays in neutral, abduction, and abduction-internal rotation positions. Wiberg's CE angle, epiphyseal extrusion were measured and graded according to Catterall. The risk factors of the patients were also identified.

All patients were treated by proximal femoral varus osteotomy (Fig. 1). In two patients we had to make an additional rotation procedure to provide better containment.



Fig. 1a: A seven years old male with a left Perthes disease. Preoperative roentgenograms.



Fig. 1b: A seven years old male with a left Perthes disease. Preoperative roentgenograms.



Fig. 1c: A seven years old male with a left Perthes disease. Postoperative 13th month.



Fig. 1d: A seven years old male with a left Perthes disease. Postoperative 13th month.



Fig. 1g: A seven years old male with a left Perthes disease. Postoperative 36th month.

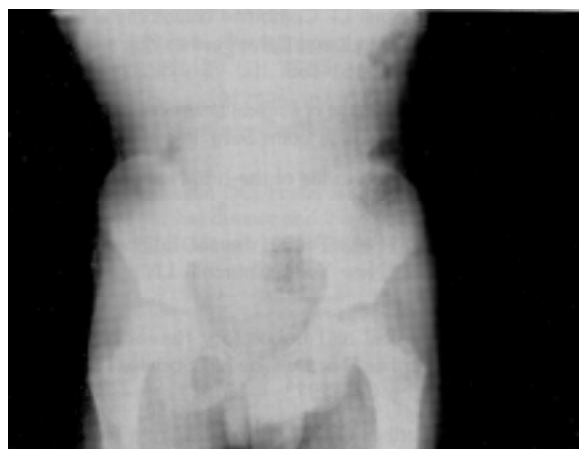


Fig. 1e: A seven years old male with a left Perthes disease. Postoperative 22nd month.



Fig. 1f: A seven years old male with a left Perthes disease. Postoperative 22nd month.

In the post-operative period hip spica cast were used for the children younger than 7 years old for 6 weeks. For the patients over seven year's short leg anti-rotation cast to prevent the rotation for three weeks were used.

Postoperatively, patients were followed-up every 1.5 months for the first 3 months, every 3 months till 1 year and every 6 months after 1 year.

The results of the treatment were discussed according to "Iowa Hip Rating" criteria's, and these included the hip movement capacities and the amount of shortness measured in the extremity x-rays.

RESULTS

According to Catterall's classification one patient was in-group II, seven patients were in-group III and the remaining five were in-group IV. All the patients had lateral subluxation as a preoperative risk factor. Mean risk factor altogether was 2.5 (range, 1 to 4).

While preoperatively the mean epiphyseal extrusion was 18.1% (range, 10.4% to 28.3%) and mean Wiberg's CE angle was 24.7° (range, 20.3° to 30.2°), in the last follow-up examinations the mean values were 9.5% (range, 7.4% to 16.7%) and 34.1° (range 27.3° to 38.5°) respectively.

Again while preoperatively mean collo-diaphyseal angle was 133.5°, this was 118.4° at the last follow-up and the main varus angulation that we achieved was 15° in the last follow-up of the patients. Collo-diaphyseal angle didn't fall below 105° in any of the patients.

When we compared the movement capabilities of the operated and healthy hips of the same patient, the mean values were 127° to 136° for flexion, 32°

to 43° for abduction, 25° to 30° for internal rotation and 26° to 34° for external rotation respectively.

The length measurements in the last follow-up gave meanly 0.8 cm. (range, 0.0 to 2.3 cm.) shortening at the operated side. Trandelanburg's test was positive in two patients.

According to "Iowa Hip Rating" criteria's the results were successful in 7 (54%) patients, moderately successful in 4 (%31) patients and unsuccessful in 2 (15%) patients. One of the patients in the bad results-group was 11 years old and the other was 10 years old and both of them were in Catterall Group IV.

DISCUSSION

For Legg-Calve-Perthes disease the aim of therapy is to achieve a normally or near normally functioning hip joint and so to prevent a future osteoarthritis. This could only be possible with the centralization of the head of the femur to the acetabulum by abduction and internal rotation and managing the hip movement in this position^{4,12,13}.

Both Stulberg et al. and Lloyd-Roberts et al. reported that they have prevented the development of osteoarthritis in Group III and Group IV Legg-Calve-Perthes patients by successful containment^{1,14-16}. Although many authors suggest conservative treatment to achieve containment, this type of therapy has some disadvantages like prolonged immobilization, limiting the daily activities of the patient, low success rate and causing social, educational and sexual problems in children¹⁷⁻²².

Operative treatment is advised for all patients with lateral subluxation and also for patients over six years of age and those with advanced femoral head involvement. By operative treatment the limited activity problem can be minimized and better correction can be achieved^{1,2,6,15,23,24}.

Proximal femoral varus osteotomy is preferred to Salter's Osteotomy because this method doesn't increase the intra-articular pressure, doesn't cause post-operative frozen joint, achieves decompression and better coverage of the femoral head in the hip joint, and enables dynamic treatment^{1,5,7,25,26}. By using the intraosseous venography technique Heikkinen et al. proved that intertrochanteric osteotomy lessens the venous stasis and achieves faster healing^{5,23,27-30}.

We believe that age is an important risk factor as well as femoral head involvement, because both of our unsuccessfully treated patients that were in Catterall's Group IV were over 10 years old.

The remarkable decrement of the re-modeling ability after 5-6 years of age tells us that mainly the group of patients over 6 years of age should be the candidates for operative treatment^{26,31-33}.

As a conclusion; treatment of severe Legg-Calve-Perthes disease haven't been well-defined. The surgeon has to make his own decision according to each patient's characteristics. We believe that proximal varus osteotomy is a reliable treatment in patients without advanced deformation or flattening of femoral head and in those with good containment in abduction and internal rotation especially if they are in-between 6-10 years of age. For older patients and for those with advanced deformity of the femoral head the results are not satisfactory.

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